

TABLE IV

weight %

Ingredients	13	14	15	16
Source of energy <sup>1</sup>	0.75	1.0	1.5	2.0
Antimicrobial <sup>2</sup>	0.001	0.001	0.001	0.001
Antimicrobial <sup>3</sup>	0.004	0.004	0.004	0.004
Citric acid	0.01	0.01	0.01	0.01
Sodium Citrate	0.006	0.006	0.006	0.006
Carrier <sup>4</sup>	balance	balance	balance	balance

1. Glucose.
2. Niolone<sup>®</sup> M-50 (Rohm & Haas).
3. Bartac<sup>®</sup> 2250 (Lonza).
4. Distilled, de-ionized water.

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TABLE V

weight %

Ingredients	17	18	19	20
Source of energy <sup>1</sup>	0.75	1.0	1.5	2.0
Antimicrobial <sup>2</sup>	0.001	0.001	0.001	0.001
Antimicrobial <sup>3</sup>	0.004	0.004	--	--
Antimicrobial <sup>4</sup>	--	--	0.004	0.004
Citric acid	0.01	0.01	0.01	0.01
Sodium Citrate	0.006	0.006	0.006	0.006
Carrier <sup>5</sup>	balance	balance	balance	balance

1. Glucose.
2. Kathon<sup>®</sup> ICP/CG II (Rohm & Haas).
3. Bartac<sup>®</sup> 2050 (Lonza).
4. Bartac<sup>®</sup> LF-80 (Lonza).
5. Distilled, de-ionized water.

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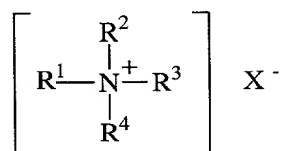
WHAT IS CLAIMED IS:

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1. A composition for controlling plant and flower moisture transpiration, said composition comprising:
- a) from about 0.5% by weight, of a source of energy;
  - b) from about 0.05 % by weight, of one or more antimicrobials; and
  - 5 c) the balance carriers and adjunct ingredients.
2. An aqueous composition for controlling plant and flower moisture transpiration, said composition comprising:
- a) from about 0.1% by weight, of a source of energy;
  - 10 b) from about 5 ppm by weight, of one or more antimicrobials;
  - c) from about 1 ppm by weight, of a buffer; and
  - d) the balance carriers and adjunct ingredients.
3. A composition according to Claim 2 wherein said source of energy comprises a  
15 saccharide, oligosaccharide, polysaccharide, or mixtures thereof.
4. A composition according to Claim 3 wherein said source of energy comprises sucrose, glucose, or mixtures thereof.
- 20 5. A composition according to Claim 4 wherein said source of energy is glucose.
6. A composition according to Claim 3 wherein said source of energy is an oligosaccharide.
7. A composition according to Claim 1 comprising from about 0.5% to about 10% by  
25 weight, of a source of energy.
8. A composition according to Claim 7 comprising from about 1% by weight, of a source of energy.
- 30 9. A composition according to Claim 8 comprising to about 5% by weight, of a source of energy.

10. A composition according to Claim 1 wherein said antimicrobial is selected from the group consisting of 2-methyl-4-isothiazolin-3-one, 5-chloro-2-methyl-4-isothiazolin-3-one, and mixtures thereof.

- 5 11. A composition according to Claim 1 wherein said antimicrobial has the formula:



wherein R<sup>1</sup> and R<sup>2</sup> are each independently C<sub>8</sub>-C<sub>20</sub> linear or branched alkyl, benzyl, and mixtures thereof; R<sup>3</sup> and R<sup>4</sup> are each independently C<sub>1</sub>-C<sub>4</sub> alkyl, and mixtures thereof; X is an anion of sufficient charge to provide electronic neutrality.

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12. A composition according to Claim 2 wherein said buffer is selected from the group consisting of citric acid, itaconic acid, malonic acid, maleic acid, caffeic acid, succinic acid, adipic acid, sebacic acid, and salts thereof.

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13. A composition according to Claim 12 wherein said buffer comprises citric acid and sodium citrate.

14. A composition according to Claim 13 comprising from 10 ppm to about 1000 ppm, citric acid and sodium citrate wherein the ratio of acid to sodium salt is from 20: 3.

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15. A composition according to Claim 14 comprising 0.016% by weight of a citric acid/sodium citrate buffer system wherein the ratio of acid to sodium salt is 5:2.

16. A composition according to Claim 2 having a pH of from about 2 to about 5.

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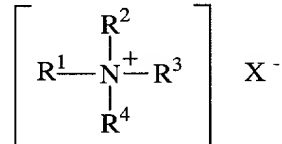
17. A composition according to Claim 16 wherein said pH is from about 3 to about 4.

18. A composition according to Claim 17 having a pH of about 4.

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19. An aqueous composition for controlling plant and flower moisture transpiration, said composition comprising:

- a) from about 0.1% by weight, of a source of energy;
- b) from about 1 ppm by weight, of an antimicrobial system, said system comprising:
- i) from 1% to 99% by weight, of said system, of one or more isothiazolone antimicrobials;
  - ii) from 1% to 99% by weight, of said system, of one or more antimicrobials having the formula:



wherein  $\text{R}^1$  and  $\text{R}^2$  are each independently  $\text{C}_8$ - $\text{C}_{20}$  linear or branched alkyl, benzyl, and mixtures thereof;  $\text{R}^3$  and  $\text{R}^4$  are each independently  $\text{C}_1$ - $\text{C}_4$  alkyl, and mixtures thereof; X is an anion of sufficient charge to provide electronic neutrality;

- c) from about 10 ppm by weight, of a buffer; and
- d) the balance carriers and adjunct ingredients.

20. A composition according to Claim 19 wherein at least one antimicrobial comprises  $\text{R}^1$  and  $\text{R}^2$  are each  $\text{C}_{12}$  alkyl;  $\text{R}^3$  and  $\text{R}^4$  are each methyl; X is chlorine.
21. A composition according to Claim 19 wherein at least one antimicrobial comprises  $\text{R}^1$  is a mixture of  $\text{C}_{12}$ - $\text{C}_{16}$  alkyl;  $\text{R}^2$  is benzyl,  $\text{R}^3$  and  $\text{R}^4$  are each methyl; X is chlorine.
22. A composition according to Claim 19 wherein said antimicrobial is an antimicrobial system comprising:
  - i) from 10 ppm to 200 ppm by weight, of didecyl dimethyl ammonium chloride;
  - ii) from 10 ppm to 200 ppm by weight, of n-alkyl dimethyl benzyl ammonium chloride wherein n-alkyl comprises an admixture of  $\text{C}_{12}$ ,  $\text{C}_{14}$ , and  $\text{C}_{16}$  linear alkyl chains; and
  - iii) from 1 ppm to 100 ppm by weight, of 1,2-benzisothiazolin-3-one.
23. A composition according to Claim 22 wherein said antimicrobial is an antimicrobial system comprising:

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- i) 100 ppm by weight of said composition, of didecyl dimethyl ammonium chloride;
  - ii) 100 ppm by weight of said composition, of n-alkyl dimethyl benzyl ammonium chloride wherein n-alkyl comprises an admixture of C<sub>12</sub>, C<sub>14</sub>, and C<sub>16</sub> linear alkyl chains; and
  - iii) 50 ppm by weight of said composition, of 1,2-benzisothiazolin-3-one.
24. A system according to Claim 19 further comprising a calcium ion sequestrant.
- 10 25. A composition according to Claim 19 having a pH of from about 2 to about 5.
26. A composition according to Claim 25 wherein said pH is from about 3 to about 4.
27. A composition according to Claim 26 having a pH of about 4.
- 15 28. A composition according to Claim 19 wherein said source of energy comprises a saccharide, oligosaccharide, polysaccharide, or mixtures thereof.
29. A composition according to Claim 28 wherein said source of energy comprises sucrose, glucose, or mixtures thereof.
- 20 30. A composition according to Claim 29 wherein said source of energy is glucose.
31. A non-liquid composition for controlling plant and flower moisture transpiration, said composition comprising:
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- a) from about 75% by weight, of a source of energy;
  - b) from about 0.05% by weight, of one or more antimicrobials;
  - c) from about 0.01% by weight, of a buffer; and
  - d) the adjunct ingredients.
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32. A composition according to Claim 31 comprising from about 90% by weight, of a source of energy.

33. A composition according to Claim 32 comprising from about 95% by weight, of a source of energy.
34. A composition according to Claim 33 comprising from about 99% by weight, of a source of energy.
35. A composition according to Claim 31 comprising from about 0.01% to about 2% by weight, of an anti-microbial.
36. A composition according to Claim 35 comprising from about 0.05% to about 0.5% by weight, of an anti-microbial.
37. A composition according to Claim 36 comprising from about 0.05% to about 0.1% by weight, of an anti-microbial.
38. A granular composition for dilution by a carrier, said composition for controlling plant and flower moisture transpiration, said composition comprising:
- from about 75% by weight, of a source of energy;
  - from about 0.01% by weight, of an antimicrobial system, said system comprising:
    - from 1% to 99% by weight, of said system, of one or more isothiazolone antimicrobials;
    - from 1% to 99% by weight, of said system, of one or more antimicrobials having the formula:
 
$$\left[ \begin{array}{c} \text{R}^2 \\ | \\ \text{R}^1 - \text{N}^+ - \text{R}^3 \\ | \\ \text{R}^4 \end{array} \right] \text{X}^-$$

wherein  $\text{R}^1$  and  $\text{R}^2$  are each independently  $\text{C}_8$ - $\text{C}_{20}$  linear or branched alkyl, benzyl, and mixtures thereof;  $\text{R}^3$  and  $\text{R}^4$  are each independently  $\text{C}_1$ - $\text{C}_4$  alkyl, and mixtures thereof; X is an anion of sufficient charge to provide electronic neutrality;
  - from about 0.98% by weight, of a buffer; and
  - the balance adjunct ingredients.

39. A composition according to Claim 38 wherein said buffer is selected from the group consisting of citric acid, itaconic acid, malonic acid, maleic acid, caffeic acid, succinic acid, adipic acid, sebacic acid, and salts thereof.

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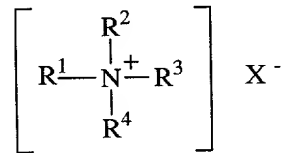
40. A composition according to Claim 39 wherein said buffer comprises citric acid and sodium citrate.

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41. A method for enhancing the longevity of cut flowers comprising the step of contacting the cut ends of said cut flowers with a vase additive solution, said solution comprising:

- a) from about 75% by weight, of a source of energy;
- b) from about 0.01% by weight, of an antimicrobial system, said system comprising:
  - i) from 1% to 99% by weight, of said system, of one or more isothiazolone antimicrobials;
  - ii) from 1% to 99% by weight, of said system, of one or more antimicrobials having the formula:

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wherein  $\text{R}^1$  and  $\text{R}^2$  are each independently  $\text{C}_8$ - $\text{C}_{20}$  linear or branched alkyl, benzyl, and mixtures thereof;  $\text{R}^3$  and  $\text{R}^4$  are each independently  $\text{C}_1$ - $\text{C}_4$  alkyl, and mixtures thereof; X is an anion of sufficient charge to provide electronic neutrality;

- c) from about 0.98% by weight, of a buffer; and
- d) the balance adjunct ingredients.

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